



The primary operational TBI component of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury

# Brainwaves

DVBIC Brainwaves • Summer 2009

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## Message from

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DVBIC leverages technology and utilizes best medical evidence to optimize care from the battlefield to the community. In this issue,

we highlight sites and services that incorporate technology at some point in the care continuum of assessment, treatment, rehabilitation, and return to duty or work.

DVBIC's newly launched Virtual Traumatic Brain Injury (vTBI) Clinic uses telemedicine to bring the full spectrum of TBI assessment and care to Service Members who ordinarily would not have ready access to TBI specialists. In addition, DVBIC recently announced research results on how Diffusion Tensor Imaging (DTI) can help define TBI, which may lead to improved quality of life for individuals with persistent symptoms or dysfunctions.

The recent in-theater team co-led by DVBIC and the Office of the Joint Chiefs of Staff is described. Our site profile spotlights the Tampa VA Polytrauma Rehabilitation Center and programs for Wounded Warriors as they move through phases of rehabilitation to recovery. We also look at cognitive rehabilitation recommendations developed at an April 2009 conference sponsored by DVBIC in partnership with DCoE.

We are pleased to announce our newly redesigned website at [www.DVBIC.org](http://www.DVBIC.org), which highlights the work of our 19 sites and offers a wealth of information on TBI.

The media continues to highlight DVBIC's work, nationally and locally. Two recent national TBI-related items were the July 12th *Parade* article by Lee Woodruff, "Can Brains be Saved?" and a July 28th CNN broadcast which concluded with a focus on DVBIC's activities to support Wounded Warriors.

The DVBIC team stands ready to connect those in need with those who can assist, either face-to-face or by applying the latest technology. Please let us know how we can help.

*"You can best support the Defense Centers of Excellence and our vision for wounded warrior care by assuring the success of the DVBIC program at your Military Treatment Facility."*

**BG Loree K. Sutton, MC, USA**  
DCoE Director  
Memo for DoD MTF Commanders



## New View With DTI

DVBIC announced new findings on how traumatic brain injury (TBI) from blast exposure differs from TBI sustained in sports or a motor vehicle accident. At the American Academy of Neurology annual meeting in May 2009, DVBIC's research was selected as one of the six most important studies featured in the "late-breaking news" plenary session.

"Blast-plus" or "Blast (+)" refers to all the elements of an explosion that cause injury, e.g., flying debris, blast-wave pressure changes in the atmosphere, extreme heat, and acceleration-deceleration (i.e., impact) that may occur in combat related TBI. Using Diffusion Tensor Imaging (DTI) at 1.5T and following a case-controlled design, researchers compared

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## DVBIC's Virtual TBI Clinic

Active Duty Service Members at distant sites can now receive care through DVBIC's Virtual Traumatic Brain Injury (vTBI) Clinic. The vTBI clinic provides comprehensive screening, assessment, treatment and management of TBI via interactive video-teleconferencing (VTC) to Service Members in all branches of the military. Referrals come from post-deployment screenings, primary care providers, case managers, behavioral health providers, the medical evaluation board (MEB) process and command-directed evaluations.

Patients are seen by a cadre of medical and psychological health specialists at Walter Reed Army Medical Center who represent multiple disciplines. Comprehensive assessment and treatment is made possible with the assistance of local

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A **traumatic brain injury (TBI)** is caused by a blow/jolt to the head or penetrating head injury that disrupts the normal function of the brain. Not all blows/jolts to the head result in a TBI. TBI severity may range from **mild** (a brief change in mental status or consciousness) to **severe** (an extended period of unconsciousness or amnesia after injury). The terms **concussion** and **mild TBI** are interchangeable.



## Going Gray

DVBIC is committed to advancing care from the front line to the community, for the entire spectrum of traumatic brain injury (TBI). It has been an honor to serve as co-leads with the Office of the Joint Chiefs of Staff for a tri-service, multi-agency team known informally as the "Gray Team," dedicated to improving systems of care for in-theater TBI.

The Gray Team's recent mission in Iraq and Afghanistan included representatives from DARPA, JIEDDO and in-country coordination with JTTS to synthesize medical and technical considerations.\* Observations and recommendations from the team addressed initiatives in education, TBI documentation and quantification, TBI diagnosis and treatment, neuropsychiatric fitness, and return-to-duty.

The Surgeon General of each service and the Chairman of the Joint Chiefs of Staff (CJCS) were briefed on the Gray Team's recommendations. Many of these suggested improvements were also summarized in a memo from the CJCS to the Secretary of Defense, providing a roadmap for continued improvements for in-theater TBI care.

The Gray Team demonstrates the collaborative and synergistic teamwork needed to address the complexity of TBI.

\*Defense Advanced Research Projects Agency (DARPA), Joint Improvised Explosive Device Defeat Organization (JIEDDO), Joint Theater Trauma System (JTTS)

## DVBIC Site Profile: Tampa VA Polytrauma Rehabilitation Center



The James A. Haley Veterans' Hospital in Tampa was established as a DVBIC lead site in 1992. Since then, DVBIC has been an integral part of multi-disciplinary traumatic brain injury (TBI) care, research and education at this polytrauma\* facility, which serves the largest number of Veterans in the nation.

Providing a full spectrum of care for TBI patients, the Tampa VA's program is a designated US Department of Veterans Affairs (DVA) Clinical Center of Excellence and holds eight CARF\*\* accreditations.

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## New Recs on Cog Rehab

DVBIC and DCoE (Defense Centers of Excellence) co-sponsored a two-day multidisciplinary consensus conference on *Cognitive Rehabilitation for Mild Traumatic Brain Injury (mTBI)*, April 27-28. Experts from the US and Canada, representing military, veterans, governmental, academic, research and medical organizations, focused on the role of this modality in treating Wounded Warriors.

Cognitive Rehabilitation, or “cog rehab,” refers to treatment modalities to improve an individual’s function after cognitive deficits (e.g., attention, memory, problem-solving) have been identified. Treatment can be **restorative** (directly improving a specific cognitive domain), **compensatory** (adapting to a particular deficit) or a combination of both. Although cognitive rehabilitation is well accepted in the rehabilitation of moderate and severe TBI, the same is not yet true for rehabilitation of mild TBI.



## DVBIC’s Virtual TBI Clinic

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providers. To date, the clinic has conducted remote TBI screenings at Fort Drum, ongoing neurology consultation at Fort Knox’s TBI headache clinic, and assistance with neuropsychological screening and full battery assessments at Marine Corps Base Quantico. Upcoming projects include collaboration with the Navy to provide shipboard consultation during mission deployments, confirmation interviews following positive endorsements of TBI on the Post-Deployment Health Assessment (PDHA), supplementing

Clinicians face increasing numbers of Wounded Warriors who, while composing a minority of the total mTBI/concussion population, have persistent cognitive problems such as decreased attention, concentration, memory, mental processing speed, organizing and planning tasks known as executive functioning.

The conference sought to identify leading practices and provide clinical guidance in four areas: assessments, interventions, outcome measures and programs.

Primary recommendations were:

1. Immediately implement the cognitive rehabilitation guidance package.
2. Standardize outcome measures to inform future research and program development.
3. Assure ongoing provider education relative to cognitive rehabilitation in the military TBI population.
4. Consider cognitive rehabilitation as a separate reimbursable treatment for mTBI with persistent cognitive deficits.

specialty care in TBI programs identified by the Army Office of The Surgeon General (OTSG) and care within the Air Force. The vTBI Clinic collaborates extensively with each service branch, the Telemedicine & Advanced Technology Research Center (TATRC) and the Telemedicine & Technology Center (T2).

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## New View with DTI

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Service Members from three groups: blast-associated TBI, TBI from a motor vehicle accident and volunteers with no evidence of TBI. Imaging results were compared group to group, i.e., two groups at a time.

DTI, a form of MRI, offers a 3-dimensional *in vivo* view of water as it moves through the white matter bundles of the brain. Patterns of preferential diffusion of water along healthy versus injured white matter help determine where injury was sustained in the brain. A more diffuse pepper spray pattern in the white matter was found in Blast (+) TBI on DTI scans, compared to TBI sustained in a motor vehicle accident.

Other DTI findings in Blast (+) patients suggested sub-acute to chronic inflammation. This suggestion of inflammation was not seen in the motor vehicle accident patients with TBI.

Often, magnetic resonance imaging (MRI) or computed tomography (CT) is normal in patients who meet clinical criteria for concussion or mild TBI. In post-concussion patients reporting persistent symptoms, DTI could perhaps serve as a unique tool for evaluating such persistent clusters of symptoms as 1) cognitive issues related to attention and short-term memory; 2) emotional symptoms such as irritability, anxiety, depression, acute distress and PTSD-like symptoms; and 3) physical symptoms such as headaches, dizziness, disequilibrium, insomnia and decreased energy.

While recent research leads to many more questions, DTI imaging does begin to answer some, such as how impact TBI differs from Blast (+), how diagnosis might be improved in the future, and how Wounded Warriors may best be evaluated for mission readiness and return-to-duty.

## DVBIC Site Profile: Tampa VA Polytrauma Rehabilitation Center

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An 18-bed inpatient unit, a transitional living step-down program and a day treatment program allow patients to receive care in the setting best suited to their level of independence. As one of 22 Polytrauma Network Sites, the Tampa VA also provides comprehensive evaluations and multidisciplinary treatment for outpatients with mild TBI.

The following specialty services are available for polytrauma patients:

- **Emerging Consciousness Cognitive Rounds** – For the minimally conscious polytrauma population, members of the neurology department join the rehabilitation team for weekly rounds to assess emerging levels of consciousness and cognition.
- **State-of-the-Art Lokomat** – harnesses patients in a robotic gait training device that helps reproduce normal walking motion, which improves muscle tone and maintains nerve pathways so the brain can more effectively re-learn walking movements.
- **Vestibular Balance Clinic** – offers physical therapy for vestibular and balance disorders, which may include evaluation on NASA-based computerized dynamic posturography, computerized dynamic visual acuity and bedside examination of the vestibular system.
- **Vision Impairment Program** – provides optometric diagnosis and rehabilitative treatment for TBI-related deficits. Neuro-ocular exams can identify damage between the brain and eye which may compromise rehabilitation if not diagnosed.
- **Adaptive Sports and Fitness Program** – allows polytrauma patients to continue pre-injury sports activities such as kayaking, golfing and scuba diving.

The following programs assist Wounded Warriors’ family members, who play a major role in successful rehabilitation:

- Weekly family support group, weekly family education series and full-time polytrauma family therapist.
- Monthly family dinners sponsored by Operation Helping Hand and Military Officers Association of America that promote camaraderie.
- At Fisher House Foundation and Haley House, long-term housing for patients’ families that encourages closeness and participation.

*To learn more, visit [www.tampa.va.gov](http://www.tampa.va.gov) and  
<http://dvbic.org/Locations/Sites/Tampa,-FL.aspx>*

*\*Polytrauma—injuries to more than one physical region or organ system, one of which may be life threatening, resulting in physical, cognitive, psychological or psychosocial impairments and functional disability.*

*\*\*Commission on Accreditation of Rehabilitation Facilities (CARF)*

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